

IN THE CLAIMS

New claims 38-61 represent old claims 1-22. The independent claims 38 and 61 have been drafted with the appropriate limitations to overcome Examiner's previous rejections and objections. In determining the proper relationship between stalk roll diameter, gathering chain drive sprocket diameter and gearbox ratios that control the rotational velocities of both the stalk roll and gathering chain drive sprocket in order to achieve minimal stalk shear, it is helpful to define a dimensionless quantity α . Herein, α is defined as the ear separation vertical velocity divided by the linear horizontal velocity (horizontal with respect to the corn head row unit) of the gathering chain paddles. This dimensionless quantity, α , captures the relationship between all the elements mentioned above through simple geometric relationships. The rotational speed (in revolutions per minute) of the stalk roll times the outer diameter of the stalk roll times pi yields the ear separation vertical velocity. The rotational speed (in revolutions per minute) of the gathering chain drive sprocket (which is the same as the rotational speed of the gathering chain drive shaft) times the number of teeth on the gathering chain drive sprocket times the length of a gathering chain link yields the linear horizontal velocity (horizontal with respect to the corn head row unit) of the gathering chain paddles. Therefore, α captures the relationship between the stalk roll diameter, gathering chain drive sprocket diameter (or number of teeth) and gearbox ratios controlling the rotational velocities of both the stalk roll and gathering chain drive sprocket. The prior art discloses values of α from 2.21 to 3.05, as could easily be discerned by one with ordinary skill in the art. The present invention employs values of $\alpha > 3.05$. The amended claims as presented would enable one of ordinary skill in the arts to implement Applicant's invention in view of Applicant's initial disclosure and U.S. Patents #3,462,928 and #5,921,070, which were incorporated by reference therein and as required by 35 U.S.C. 112, paragraph 1. The amended claims as now presented are definite as required by 35 U.S.C. 112, paragraph 2.

CLAIMS LISTING

1.-37. (Cancelled)

38. (New) An improved arrangement of a corn head row unit comprising:

- a. a source of power for rotation;
- b. at least one stalk roll for engagement with a corn plant having at least one ear of corn;
- c. said at least one stalk roll having at least one flute;
- d. at least one stripper plate arranged above said at least one stalk roll;
- e. at least one gathering chain having a plurality of paddles affixed thereto, wherein said at least one gathering chain cooperates with a first and second sprocket and wherein said first sprocket is a drive sprocket and said second sprocket is a coast sprocket; and,
- f. a gearbox fixing the rotational speed of said gathering chain drive sprocket and the rotational speed of said at least one stalk roll flute during operation, wherein the rate at which said corn plant is vertically (with respect to said corn head row unit) consumed by said at least one stalk roll is defined as the ear separation vertical velocity, wherein the resulting ear separation vertical velocity is selected from 6 to 13 miles per hour for minimal damage to said at least one ear of corn upon impact with said at least one stripper plate and wherein a dimensionless quantity α is defined as the ear separation vertical

velocity divided by the linear horizontal (with respect to said corn head row unit) velocity of said plurality of gathering chain paddles, and wherein α is greater than 3.05 to minimize stalk shear.

39. (New) The improved arrangement of a corn head row unit as set forth in claim 38 having two opposing stalk rolls for engagement with said corn plant.

40. (New) The improved arrangement of a corn head row unit as set forth in claim 38 wherein the length of said at least one stalk roll has been selected to increase the horizontal distance said corn plant is able to travel before said corn plant is exposed to a shearing position so that the amount of said corn plant vertically consumed by said at least one stalk roll per length of said at least one stalk roll is set so that substantially all of said at least one ear(s) of corn impact said at least one stripper plate prior to shearing of said corn plant to minimize stalk shear.

41. (New) The improved arrangement of a corn head row unit as set forth in claim 38 wherein the size of said gathering chain drive sprocket size has been selected to decrease the linear horizontal speed of said plurality of gathering chain paddles to increase the dimensionless quantity α to a value greater than 3.05 to minimize stalk shear.

42. (New) The improved arrangement of a corn head row unit as set forth in claim 41 wherein said gathering chain drive sprocket has less than 8 teeth and said coast sprocket has 8 or more teeth.

43. (New) The improved arrangement of a corn head row unit as set forth in claim 41 wherein said gathering chain drive sprocket has less than 10 teeth and said coast sprocket has 10 or more teeth.
44. (New) The improved arrangement of a corn head row unit as set forth in claim 38 wherein the diameter of said at least one stalk roll has been selected to increase α to a value greater than 3.05 to minimize stalk shear.
45. (New) The improved arrangement of a corn head row unit as set forth in claim 44 wherein the diameter of said at least one stalk roll is in the range of 3.5-5.0 inches.
46. (New) The improved arrangement of a corn head row unit as set forth in claim 39 wherein the length of said stalk rolls has been selected to increase the horizontal distance said corn plant is able to travel before said corn plant is exposed to a shearing position so that the amount of said corn plant vertically consumed by said stalk rolls per length of said stalk rolls is set so that substantially all of said at least one ear(s) of corn impact said stripper plates prior to shearing of said corn plant to minimize stalk shear.
47. (New) The improved arrangement of a corn head row unit as set forth in claim 46 wherein the length of said at stalk rolls is greater than twenty-two inches.
48. (New) The improved arrangement of a corn head row unit as set forth in claim 39 wherein the size of said gathering chain drive sprocket size has been

selected to decrease the linear horizontal speed of said plurality of gathering chain paddles to increase the dimensionless quantity α to a value greater than 3.05 to minimize stalk shear.

49. (New) The improved arrangement of a corn head row unit as set forth in claim 48 wherein said gathering chain drive sprocket has less than 8 teeth and said coast sprocket has 8 or more teeth.
50. (New) The improved arrangement of a corn head row unit as set forth in claim 48 wherein said gathering chain drive sprocket has less than 10 teeth and said coast sprocket has 10 or more teeth.
51. (New) The improved arrangement of a corn head row unit as set forth in claim 39 wherein the diameter of said at least one stalk roll has been selected to increase α to a value greater than 3.05 to minimize stalk shear.
52. (New) The improved arrangement of a corn head row unit as set forth in claim 51 wherein the diameter of said at least one stalk roll is in the range of 3.5-5.0 inches.
53. (New) An improved arrangement of a corn head row unit as set forth in claim 38 wherein said corn head row unit has a shear point with a rounded edge.
54. (New) An improved arrangement of a corn head row unit as set forth in claim 39 wherein said corn head row unit has a shear point with a rounded edge.

55. (New) The improved arrangement of a corn head row unit as set forth in claim 53 wherein said shear point is removable allowing for replacement.
56. (New) The improved arrangement of a corn head row unit as set forth in claim 54 wherein said shear point is removable allowing for replacement.
57. (New) The improved arrangement of a corn head row unit as set forth in claim 38 wherein the internal gearing of said gear box has been selected so that α is greater than 3.05 to minimize stalk shear.
58. (New) The improved arrangement of a corn head row unit as set forth in claim 39 wherein the internal gearing of said gear box has been selected so that α is greater than 3.05 to minimize stalk shear.
59. (New) The improved arrangement of a corn head row unit as set forth in claim 38 wherein the combination of internal gearing of said gear box, the diameter of said at least one stalk roll and the size of said gathering chain drive sprocket are selected to produce an α greater than 3.05 to minimize stalk shear.
60. (New) The improved arrangement of a corn head row unit as set forth in claim 39 wherein the combination of internal gearing of said gear box, the diameter of said stalk rolls and the size of said gathering chain drive sprockets are selected to produce an α greater than 3.05 to minimize stalk shear.
61. (New) An improved arrangement of a corn head row unit comprising:

- a. an engaging means for engaging a corn plant with a plurality of rotational elements;
- b. a pinching means for pinching said corn plant between said plurality of rotational elements;
- c. a pulling means for pulling said corn plant down with said plurality of rotational elements;
- d. a separation means for separating an ear of corn from said corn plant, wherein the rate at which said corn plant is vertically (with respect to the corn head row unit) consumed by said plurality of rotational elements is between 6 and 13 miles per hour for minimal damage to said ear of corn upon impact with said separation means;
- e. a horizontal movement means for engaging said ear of corn for horizontal (with respect to said corn head row unit) movement to an ear collection means and further processing within the threshing unit of a harvesting processor; and,
- f. a power source for said engaging, pinching, pulling and horizontal movement means wherein the relative speed of said engaging, pinching, pulling and horizontal movement means is fixed during operation and wherein the speed of linear vertical consumption of said corn plant by pulling means divided by the linear speed of said horizontal movement means is greater than 3.05.